Release Notes for Router Software Version 11.0

Router Software Version 11.0
Site Manager Software Version 5.0

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Bay Networks

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Technical Support and Online Services

To ensure comprehensive network support to our customers and partners worldwide, Bay Networks Customer Service has Technical Response Centers in key locations around the globe:

- Billerica, Massachusetts
- Santa Clara, California
- Sydney, Australia
- Tokyo, Japan
- Valbonne, France

The Technical Response Centers are connected via a redundant Frame Relay Network to a Common Problem Resolution system, enabling them to transmit and share information, and to provide live, around-the-clock support 365 days a year.

Bay Networks Information Services complement the Bay Networks Service program portfolio by giving customers and partners access to the most current technical and support information through a choice of access/retrieval means. These include the World Wide Web, CompuServe, Support Source CD, Customer Support FTP, and InfoFACTS document fax service.

Bay Networks Customer Service

If you purchased your Bay Networks product from a distributor or authorized reseller, contact that distributor's or reseller's technical support staff for assistance with installation, configuration, troubleshooting, or integration issues.

Customers can also purchase direct support from Bay Networks through a variety of service programs. As part of our PhonePlus™ program, Bay Networks Service sets the industry standard, with 24-hour, 7-days-a-week telephone support available worldwide at no extra cost. Our complete range of contract and noncontract services also includes equipment staging and integration, installation support, on-site services, and replacement parts delivery -- within approximately 4 hours.

To purchase any of the Bay Networks support programs, or if you have questions on program features, use the following numbers:

Region	Telephone Number	Fax Number
United States and Canada	1-800-2LANWAN; enter Express Routing Code (ERC) 290 when prompted (508) 436-8880 (direct)	(508) 670-8766
Europe	(33) 92-968-300	(33) 92-968-301
Asia/Pacific Region	(612) 9927-8800	(612) 9927-8811
Latin America	(407) 997-1713	(407) 997-1714

In addition, you can receive information on support programs from your local Bay Networks field sales office, or purchase Bay Networks support directly from your authorized partner.

Bay Networks Information Services

Bay Networks Information Services provide up-to-date support information as a first-line resource for network administration, expansion, and maintenance. This information is available from a variety of sources.

World Wide Web

The Bay Networks Customer Support Web Server offers a diverse library of technical documents, software agents, and other important technical information to Bay Networks customers and partners.

A special benefit for contracted customers and resellers is the ability to access the Web Server to perform Case Management. This feature enables your support staff to interact directly with the network experts in our worldwide Technical Response Centers. A registered contact with a valid Site ID can

- View a listing of support cases and determine the current status of any open case. Case history data includes severity designation, and telephone, e-mail, or other logs associated with the case.
- Customize the listing of cases according to a variety of criteria, including date, severity, status, and case ID.
- Log notes to existing open cases.
- Create new cases for rapid, efficient handling of noncritical network situations.
- Communicate directly via e-mail with the specific technical resources assigned to your case.

The Bay Networks URL is *http://www.baynetworks.com*. Customer Service is a menu item on that home page.

Customer Service FTP

Accessible via URL *ftp://support.baynetworks.com* (134.177.3.26), this site combines and organizes support files and documentation from across the Bay Networks product suite, including switching products from our Centillion™ and Xylogics® business units. Central management and sponsorship of this FTP site lets you quickly locate information on any of your Bay Networks products.

Support Source CD

This CD-ROM -- sent quarterly to all contracted customers -- is a complete Bay Networks Service troubleshooting knowledge database with an intelligent text search engine.

The Support Source CD contains extracts from our problem-tracking database; information from the Bay Networks Forum on CompuServe; comprehensive technical documentation, such as Customer Support Bulletins, Release Notes, software patches and fixes; and complete information on all Bay Networks Service programs.

You can run a single version on Macintosh Windows 3.1, Windows 95, Windows NT, DOS, or UNIX computing platforms. A Web links feature enables you to go directly from the CD to various Bay Networks Web pages.

CompuServe

For assistance with noncritical network support issues, Bay Networks Information Services maintain an active forum on CompuServe, a global bulletin-board system. This forum provides file services, technology conferences, and a message section to get assistance from other users.

The message section is monitored by Bay Networks engineers, who provide assistance wherever possible. Customers and resellers holding Bay Networks service contracts also have access to special libraries for advanced levels of support documentation and software. To take advantage of CompuServe's recently enhanced menu options, the Bay Networks Forum has been re-engineered to allow links to our Web sites and FTP sites.

We recommend the use of CompuServe Information Manager software to access these Bay Networks Information Services resources. To open an account and receive a local dial-up number in the United States, call CompuServe at 1-800-524-3388. Outside the United States, call 1-614-529-1349, or your nearest CompuServe office. Ask for Representative No. 591. When you are on line with your CompuServe account, you can reach us with the command **GO BAYNET**.

InfoFACTS

InfoFACTS is the Bay Networks free 24-hour fax-on-demand service. This automated system has libraries of technical and product documents designed to help you manage and troubleshoot your Bay Networks products. The system responds to a fax from the caller or to a third party within minutes of being accessed.

To use InfoFACTS in the United States or Canada, call toll-free 1-800-786-3228. Outside North America, toll calls can be made to 1-408-764-1002. In Europe, toll-free numbers are also available for contacting both InfoFACTS and CompuServe. Please check our Web page for the listing in your country.

How to Get Help

Use the following numbers to reach your Bay Networks Technical Response Center:

Technical Response Center	Telephone Number	Fax Number
Billerica, MA	1-800-2LANWAN	(508) 670-8765
Santa Clara, CA	1-800-2LANWAN	(408) 764-1188
Valbonne, France	(33) 92-968-968	(33) 92-966-998
Sydney, Australia	(612) 9927-8800	(612) 9927-8811
Tokyo, Japan	(81) 3-5402-0180	(81) 3-5402-0173

Release Notes for Router Software Version 11.0

This document contains the latest information about Bay Networks™ Router Software Version 11.0:

- Supported bridging/routing protocols
- Upgrading information
- New features
- Guidelines for using Version 11.0
- Supported router modules
- Tested configurations
- Supported Flash memory cards
- Supported standards

Protocols Supported

Version 11.0 of Bay Networks Router Software supports the following bridging/routing protocols and router configuration features:

- AppleTalk and AppleTalk Update-based Routing Protocol (AURP)
- Advanced Peer-to-Peer Networking (APPN)
- Asynchronous Transfer Mode (ATM)
- ATM Data Exchange Interface (ATMDXI)
- ATM LAN Emulation
- Binary Synchronous Communication Type 3 (BSC3)
- Bootstrap Protocol (BOOTP)
- Border Gateway Protocol (BGP-3 and BGP-4)
- Classless Inter-Domain Routing (CIDR)
- Data Compression
- Data Link Switching (DLSw)
- DECnet Phase IV Routing Protocol
- Dial Backup, Dial-on-Demand, and Bandwidth-on-Demand
- Distance Vector Multicast Routing Protocol (DVMRP)
- Dynamic Host Configuration Protocol (DHCP)
- Exterior Gateway Protocol-2 (EGP-2)
- Frame Relay
- File Transfer Protocol (FTP)
- HP Probe Protocol
- Inbound and Outbound Traffic Filter Features
- Integrated Services Digital Network (ISDN)
- Interface Redundancy
- Internet Gateway Management Protocol (IGMP)
- Internet Protocol (IP)
- Internet Packet Exchange (IPX) Protocol

- Internet Service Provider Mode
- Internet Stream Protocol (ST2)
- Learning Bridge and Spanning Tree Protocols
- Logical Link Control 2 (LLC2) Protocol
- Native Mode LAN (NML) Protocol
- Network Time Protocol (NTP)
- Open Shortest Path First (OSPF) Protocol
- Open Systems Interconnection (OSI) Routing Protocol
- Point-to-Point Protocol (PPP)
- Protocol Prioritization
- Router Discovery
- Router Redundancy
- Synchronous Data Link Control (SDLC)
- Simple Network Management Protocol (SNMP)
- Source Routing Bridge Protocol
- Switched Multi-Megabit Data Service (SMDS)
- Telnet Protocol (Inbound and Outbound)
- Transmission Control Protocol (TCP)
- Transparent-to-Source Routing Translation Bridge
- Virtual Networking System (VINES)
- X.25 Protocol
- XMODEM and YMODEM Protocols
- Xerox Network Systems (XNS) Protocol

Upgrading to Version 11.0/5.0

To upgrade your router software to Version 11.0, or to upgrade your Site Manager software to Version 5.0, refer to *Upgrading Routers from Version 7-9.xx to Version 11.0* for instructions. This document is included in your upgrade package. These Release Notes also contain information relevant to upgrading routers.

New Features in Version 11.0

Bay Networks has implemented many changes to the router software for Version 11.0. This section describes the major new features in this release.

MCE1 Net Module

With Release 11.0, the MCE1 net module is now supported on 5380 and 5580 routers.

Data Link Switching (DLSw) Services

Version 11.0 includes support for RFC 1795. For complete information, refer to *Configuring DLSw Services*.

RFC 1795, called DLSw Version 1, is an implementation of DLSw developed by a consortium of vendors. RFC 1795 supersedes the original DLSw specification, RFC 1434. Starting with Version 11.0, Bay Networks DLSw routers support RFC 1795. These routers are fully compatible with Bay Networks routers that support the original RFC 1434 specification with Version 10.0 or earlier software.

Based on RFC 1434, RFC 1795 includes features that were not originally published, as well as modifications to the standard. RFC 1795 includes

- Modified frame format for session setup, including a field for the largest frame size.
- Directed broadcast CANUREACH and ICANREACH control frames. This feature reduces broadcasting over the network.
- Capabilities exchange, allowing routers to exchange resource information about each other. Capabilities exchange flows operate in three categories:
  - -- Fixed information, such as an organization's router software version
  - -- Customized information, where one router transfers the information to another router
  - -- Negotiation, where routers negotiate the use of proprietary functions (and only if both routers support the functions under negotiation)
- Rate-based pacing, a new standard for flow control between routers.

Flow control allows a DLSw router to inform another router to slow down or stop sending data when the receiving buffer(s) fill up. Rate-based flow control uses a windowing mechanism that allows the routers to send more or fewer packets, based on the state of the last receive window. If the router successfully receives the last transmission, it informs the sending router to continue to send more packets. Flow control is essential for successful delivery of SNA and NetBIOS data.

Dial Services

The following features are new in Version 11.0 for Dial services. For important information about using demand circuits for backup, see "Guidelines for Using Version 11.0," later in these release notes.

Dial Backup of Multilink Leased Lines

Dial backup service is now available for leased multilink connections. In previous releases, it was available for only a single leased line or a leased multiline (Standard and PPP only). For more information, refer to *Configuring Dial Services*, Chapter 1.

Dial Backup over Frame Relay

Dial backup service is now available for an entire Frame Relay interface using Frame Relay across the backup circuit. You can now back up the entire Frame Relay interface, which means you can back up multiple PVCs instead of just one PVC. In previous releases, you could only back up a single Frame Relay PVC using PPP across the backup circuit. For more information, refer to *Configuring Dial Services*, Chapter 1.

Dial Optimized Routing

Dial optimized routing lets you exchange IP RIP and IPX RIP/SAP routing updates when a connection is active for data transmission. By limiting when the router can send updates, dial optimized routing reduces unnecessary connections and line costs. For more information, see *Configuring Dial Services*, Chapter 4.

Inactivity Mode

We have added inactivity mode and inactivity timer parameters to monitor inactivity based on the direction of traffic (transmit, receive, both, or either). You can configure inactivity mode for both inbound and outbound traffic. PPP's LQR, LCP, and periodic CHAP messages will not reset inactivity. For more information, refer to *Configuring Dial Services*, Chapter 8.

Traffic Filters

We have added new rules for traffic filters. To prevent routing updates and protocol-specific messages from keeping the circuit up, you can configure traffic filters that specify which packets are permitted across an established dial-up line and which packets are prevented from bringing up a dial-up line. You can also filter outbound packets to prevent the inactivity timer from resetting. For more information, refer to *Configuring Dial Services*, Chapter 4.

PRI Multirate

PRI multirate enables you to specify how many B channels will be allocated on a call-by-call basis. Depending on how many B channels you combine, the bandwidth can range from 128 Kb/s to 1472 Kb/s. This allows you to choose the most suitable bandwidth for an application.

Applications such as dial backup and video conferences benefit from the flexibility of multirate service. Also, service providers offer multirate service at low tariffs relative to other ISDN services, which makes it a good option for many applications. For more information, refer to *Configuring Dial Services*, Chapter 3.

PRI Support for the ASN

The ASN™ now offers ISDN PRI service. For more information, refer to *Configuring Dial Services*, Chapter 3.

BRI Leased Line Operation for Japan

For BRI service in Japan, the router allows you to support a permanent point-to-point ISDN connection over a B channel without having to use the D channel to dial the call. This connection operates like a leased line. This option is useful when ISDN service providers do not use the D channel. For more information, refer to *Configuring Dial Services*, Chapter 3.

Point-to-Point Protocol (PPP) Services

The following features are new in Version 11.0 for PPP.

Asynchronous PPP

With Version 11.0, PPP supports the use of asynchronous modems connected to QUICC-based COM ports (that is, BayStack™ AN®, ASN, and BN® router octal sync modules support async ports). Asynchronous PPP support lets you use less expensive asynchronous modems to dial in to a Bay Networks router or terminal server. Asynchronous PPP is implemented as described in RFC 1662.

Additional Lines in a Multilink Bundle

The maximum number of lines allowed in a multilink bundle is now 30. The actual practical maximum depends on the nature of the network traffic and the network configuration.

Multilink Fragmentation

Enabling fragmentation means that PPP can split packets when necessary for better performance. With fragmentation enabled, PPP can split packets into fragments, then send the fragments over the lines in the multilink bundle, reassembling them on the receiving peer into the proper sequence. You can specify the minimum packet size to be considered for fragmentation. Multilink fragmentation is implemented as described in RFC 1717.

One-Way Authentication

One-way authentication uses an authentication protocol on only one side of a dial-up connection. The router placing the call disables the authentication protocol for a circuit, while the router on the receiving side enables authentication. Disabling the outbound authentication lets the router interoperate with other devices that may not allow two-way authentication or support CHAP. To use one-way authentication, you must also configure certain options for the switched circuit itself. See *Configuring Dial Services* for a description of how you must set up dial services to enable one-way authentication.

Disabling Loopback Detection

As part of its network integrity checking, PPP tests for a loopback condition in which, effectively, the router is talking with itself and not communicating with the network. In Version 11.0, for test purposes, you can disable this loopback detection feature.

For more information on these features, refer to *Configuring PPP Services* and *Configuring Dial Services*.

Frame Relay Service Records

Bay Networks now uses *service records* to define Frame Relay circuits. A service record is a data structure that allows flexible grouping and characterization of PVCs. A service record can contain a single PVC or multiple PVCs. For further information about Bay Networks implementation of service records, refer to *Configuring Frame Relay Services*. For information about how service records differ from access modes, see "Guidelines for Using Version 11.0," later in these release notes.

Hardware Compression for Frame Relay and PPP on the ASN

Our compression services now include hardware-based compression for Frame Relay and PPP networks for the ASN. A compression net module compresses data transmitted over a WAN network by dual synchronous, MCE1/ISDN PRI, dual sync with ISDN BRI, and Quad BRI net modules. For further information about Bay Networks data compression services, refer to *Configuring Data Compression Services*.

Interface Redundancy

Interface redundancy now works with AppleTalk and VINES. For further information about interface redundancy, refer to *Configuring Interface and Router Redundancy.*

X.25 Services

We have added the following new features to the X.25 services

IPEX

Bay Networks X.25 services now include tunneling over TCP/IP Internet (IPEX). IPEX lets you send and receive messages between two X.25 systems via a TCP/IP network. The tunneling maps TCP sockets to X.25 virtual circuits.

IPEX works with X.25 switched virtual circuits (SVCs) as well as with TCP/IP protocols over all interface types that Bay Networks routers support. For further information about IPEX, refer to *Configuring X.25 Services*.

X.25 Support for RFC 1356

RFC 1356 defines a standard for multiprotocol encapsulation over X.25 networks. Bay Networks implements RFC 1356 for IP, OSI, IPX, DECnet, and XNS. This means you can use Bay Networks routers at one end of a connection, and equipment from another vendor (that also supports RFC 1356 for these protocols) at the other end of the connection. For further information about RFC 1356, refer to *Configuring X.25 Services*.

IP Services

The following features are new in 11.0 for IP services.

RIP Support for Dial-Optimized Routing

Dial-optimized routing (DOR) reduces costs on dialed lines. Under DOR, RIP exchanges routing information on the interface only when the router or a peer has activated the connection for a data transmission. RIP does not initiate a connection on a dialed line just to issue a routing update, unless it is the first time the dial line is initialized.

For information on configuring a RIP interface for DOR, see *Configuring IP Services*, Chapter 4.

IP Accounting Support for Frame Relay Interfaces

IP Accounting counts transit data packets -- that is, packets that IP receives on one interface and forwards to another interface. This mechanism allows a network service provider to bill a network user according to the amount of data routed between two locations.

Bay Networks currently provides IP accounting support for Frame Relay networks. For information on configuring a Frame Relay interface for IP accounting, see *Configuring IP Services*, Chapter 3.

IP accounting keeps track of transit data packets by making an entry for each packet in an IP accounting table. Each entry includes the source and destination addresses of the packet, the number of packets forwarded, and the number of bytes forwarded.

ISP Mode

ISP mode provides the following features for internet service providers (ISPs).

- Suppression of IP forwarding tables.

  By default, IP maintains a forwarding table on each IP interface. IP uses this table as a cache for routes that are frequently used to forward data packets that arrive on the interface. In ISP mode, IP does not use forwarding tables.

- BGP soloist

  By default, BGP runs on all slots configured with IP interfaces. In ISP mode, BGP runs as a soloist.

  By default, ISP mode features are disabled on the router. For information, see *Configuring IP Services*, Chapter 3.

Dynamic BGP Policy Configuration

By default, BGP configures IP policies dynamically. This means that if you modify a policy, BGP dynamically re-evaluates all affected routes as a result.

For complete information on BGP dynamic policy configuration, see *Configuring IP Services*, Chapter 6.

BGP Communities

The BGP communities attribute identifies the communities to which the route belongs. (A community is a group of destinations that share some common property.)

You can configure a BGP accept or announce policy to match a BGP community. For complete information, see Appendix B of *Configuring IP Services*.

Simplified Regular Expressions for BGP AS Pattern Matching

In the Bay Networks implementation of AS path pattern matching for Version 10.0, the user must know regular expression syntax. For Version 11.0, we have provided a simpler syntax. For complete information, see *Configuring IP Services*, Chapter 6. You can also use the **ip bgp_routes** command in the Technician Interface in AS pattern matching. For complete information, see *Using Technician Interface Software*, Chapter 8.

Static Host Entry Support for IGMP

A network may include a member of a multicast group that is unable to register its network with the local IGMP router; for example, a host that is a member of a multicast group but that is not running IGMP.

In such a situation, you can register the group member's network statically on the router. For complete information, refer to *Configuring IP Multicast Services*, Chapter 3.

NTP Support

The Network Time Protocol (NTP) synchronizes the timing of internal clocks of various internet devices across large, diverse networks to universal standard time. NTP runs over UDP, which in turn runs over IP. The NTP protocol specification is documented in RFC 1305.

The current implementation of NTP supports only NTP Client mode. In this mode, the local NTP client, which runs on a router, accepts time information from other remote time servers and adjusts its clock accordingly. However, the NTP local client will not attempt to synchronize another device's clock.

Line Resource Reservation for 100-Mb/s Ethernet Circuits

You can now enable the Line Resource Manager (LRM) on 100-Mb/s Ethernet interfaces. The LRM allows you to configure quality of service (QoS) support for realtime applications, and simultaneously maintain bandwidth for other traffic. Using LRM, you define a percentage of a line's bandwidth as reservable. Applications that require QoS support negotiate for the reservable bandwidth. See *Configuring Line Services* for more information.

New and Enhanced Technician Interface Scripts

This section describes new and enhanced Technician Interface scripts. For complete information, see *Using Technician Interface Scripts*.

- **show appn switch** <*RTP_conn_name*> -- Adds a new option that requests the APPN node to perform a path switch with a currently active RTP connection, then displays the results.
- **show lane data_vcs** -- Adds a new option that shows ATM control VCs and data VCs.
- **show ntp** -- Adds a new command group that shows statistics for the Network Time Protocol.
- **show sws** -- Adds options for **on-demand dialing_groups**, **optimized_routing**, and **pap_chap_ information**.
- **show x25** -- Adds options for IP over X.25 (**ipex maps** and **ipex session**).
- **show atmarp table** -- Includes improved information on the contents of the VPI/VCI resolution table.
- **show atm interface** -- Adds signaling version information to the display.
- **show isdn calls time** -- Adds a circuit number column to the display.
- **show ds1e1 timeslot** -- Improves the display with current, rather than originally configured DS1E1 timeslot assignments.
- **show csmacd**, **show ftp**, **show fr**, **show ip**, **show snmp**, **show sync**, **show tcp**, **show telnet**, **show tftp** -- Updates displays for these embedded scripts.
- **show process** -- Updates sampling interval from 5 to 30 seconds for the **buffers**, **cpu**, and **memory** options.
- **show smds** -- Adds some address verification information to the **stats** and **circuit** options**.**

- **show state all** and **show circuits** -- Adds IPX SAP (IPX Service Advertising Protocol) information to displays.

Guidelines for Using Version 11.0

The following guidelines are new in Version 11.0.

IP Equal-Cost Multipath Routing

Version 11.0 does not support IP equal-cost multipath routing for RIP and OSPF.

DCM Software Image and Router Software Compatibility

The Version 1.4 DCM software image is backward-compatible with Router Software Versions 9.0*x* and 10.0*x*. However, if you plan to run RMON on a Version 11.0 AN or ANH™ router, you must upgrade the DCM software image to Version 1.4 first. If you attempt to run RMON on an 11.0 router that has a DCM software image version earlier than Version 1.4 (for example, Version 1.3.0 or 1.3.1), you will get an error message from the RMON Summary application telling you that the router does not support RMON.

Configuring an AN Router that Supports the RMON DCM (Board)

To monitor an AN router containing an RMON DCM board with a tool such as Optivity® Analysis, you must first configure the Ethernet interface, using Site Manager.

Joining an Incompatible Emulated LAN

Bay Networks routers currently support only Ethernet IEEE 802.3 emulated LAN connectivity. When accepting the default, Unspecified, for the LEC LAN Type parameter, ensure that the LAN Emulation Configuration Server (LECS) supplies a configuration for an IEEE 802.3 emulated LAN. (Refer to *Configuring ATM Services* for more information about the LEC LAN Type parameter.)

If the LECS tries to assign a client to a Token Ring 802.5 emulated LAN, the attempt fails and the router software generates the following log message:

```
#   58: 01/11/96 17:05:59.714   WARNING   SLOT  5  ATM_LE Code:  34
LEC: Config Resp incompatible LAN type (802.5) returned - FAILED
```

Quad Multichannel T1 Link Module

The Quad Multichannel T1 (QMCT1) Link Module operates only in routers with a FRE®-2 series Fast Routing Engine processor.

Netboot on a System 5780 ATM Router

Netboot is not supported on a System 5780 ATM Router.

Support for Banyan 80C4 ISAP

Bay Networks routers now support the Banyan 80C4 ISAP on Ethernet.

Increasing AN and ANH Memory Partitions

AN and ANH memory partitions can be 1824 or 4800 bytes. By default, Token Ring AN routers initialize with a memory partition (buffer size) of 4800 bytes; Ethernet AN and ANH systems initialize with a buffer size of 1824 bytes. The Technician Interface stores the buffer size in nonvolatile read-access memory (NVRAM) and reads it at boot time.

You can change the default buffer size for an AN or ANH. For example, if an Ethernet AN or ANH running OSPF/IP experiences problems resulting from small buffer sizes, you can increase the buffer size. This process is similar to carving local and global memory partitions; however, you cannot use Site Manager to perform buffer carving.

- Set the buffer size on an AN or ANH system by entering the following commands at the Technician Interface prompt:

Note: Be sure to enter the commands in the following order.

set wfKernCfgParamEntry.wfKernCfgParamDelete.1 1
set wfKernCfgParamEntry.wfKernCfgParamBufSize.1 4800 (or 1824)

The Technician Interface saves the new buffer size in NOVRAM, and uses this setting at subsequent boots to determine the buffer size.

set wfKernCfgParamEntry.wfKernCfgParamDelete.1 2

You must delete all instances of *wfKernCfgParamEntry* before saving the configuration file.

commit
reset 1

- Reset the buffer size back to the default value with these Technician Interface commands:

  set wfKernCfgParamEntry.wfKernCfgParamBufSizeReset.1 1
  commit

Using IPX Dial Optimized Routing (DOR)

The following information will help you use DOR optimally.

Inactivity Mode

We recommend that you set the Inactivity Mode parameter to Transmit Only. Any other setting causes the inactivity mode to reset when the receive end can't filter Serialization, Watchdog, and Keep Alive packets for NORESET. These packets could keep the demand line active for long periods of time.

RIP/SAP Pace and Packet Size Parameters

As IPX routes and services grow in number, IPX RIP and SAP packets may be clipped when an IPX DOR circuit comes up or changes state. To stop the clipping, reduce the value of the Pace parameter for RIP and SAP packets or change the RIP/SAP packet size for the IPX DOR circuit. You should reduce the RIP/SAP Pace parameter for IPX DOR circuits to accommodate the number of IPX routes and services in the network.

Diagnostic Packets and Time Synchronization

No default priority queuing filters exist for IPX diagnostics packets or packets used in NDS time synchronization. You can configure a priority queueing filter to keep IPX diagnostic packets from bringing up a demand line. However, since the Bay Networks IPX ping packet is a diagnostic packet, the filter will affect it as well.

NDS time synchronization packets are treated as data packets. You can configure NetWare servers for larger polling intervals to reduce the frequency of bringing up the line for time synchronization packets.

Using Frame Relay Service Records

The following sections compare service records to the access modes that formerly defined Bay Networks Frame Relay services.

Group Access Mode

In group access mode, upper-layer protocols treat each Frame Relay network interface as a single access point to the switched network. The upper-layer protocols use a single network address to send all traffic destined for the switched network to the Frame Relay network interface. When you configure each router, you assign only one network address, for example an IP or IPX address, to the Frame Relay interface, not to each PVC. The DLCMI dynamically configures PVCs; you do not need to explicitly configure them.

Group access mode advantages are that it

- Supports all protocols.
- Simplifies network addressing because you define and associate only one protocol address with the Frame Relay interface.
- Is easy to configure.
- Conserves resources because it requires a small number of circuits.

Its disadvantages are that it

- Allows only one group of PVCs per Frame Relay connection.
- Uses large amount of buffer space during broadcasts.
- Increases customer costs because it has only a single broadcast domain.

Service Records and Group Mode

Service records retain all of the advantages of group mode. Service records also

- Allow multiple groups of PVCs per Frame Relay connection.
- Enable you to gather multiple PVCs for each network protocol into a separate group or service record, thereby reducing the number of buffers needed per circuit during broadcasts.
- Lower customer costs by creating multiple broadcast domains.

Using service records to define Frame Relay removes the need to think in terms of group mode.

Service Records and Direct Access Mode

In direct access mode, upper-layer protocols treat the Frame Relay network as a series of point-to-point connections. The upper-layer protocols view each PVC as an individual network interface.

Direct access mode advantages are that it

- Limits broadcasts to one PVC.
- Enables multiple layer-three networks per interface.

Direct access mode disadvantages are that it

- Creates a new Frame Relay circuit for each PVC, consuming router resources.
- Allows only one PVC per network.

Service Records and Direct Mode

A service record with a single PVC is the same as a direct access mode PVC. Using service records to define Frame Relay removes the need to think in terms of direct mode.

Service Records and Hybrid Access Mode

Hybrid access mode, as its name implies, combines characteristics of group and direct access modes. It works only for non-fully meshed network configurations that use both bridging and routing over a single Frame Relay interface. This mode is also best for spanning tree bridging.

You configure hybrid mode by enabling the hybrid mode service record parameter. See Chapter 3, “Customizing Frame Relay,” for instructions.

Default Service Record

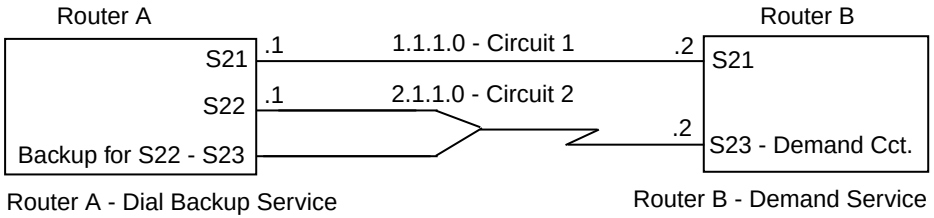
The router creates the first service record automatically. This first service record is called the *default service record*. Any PVCs that are not associated with a configured service record use the default service record.

Using Demand Circuits for Backup

For 11.0, you can configure a demand circuit to act as a back up for a failed point-to-point circuit. If the point-to-point circuit fails, the router immediately establishes a demand circuit back to the original router and data transmission can continue. The demand circuit can operate independently of the point-to-point circuit, so the demand circuit can remain active after the point-to-point recovers.

This type of configuration is recommended only if you want to keep the demand circuit active after the point-to-point circuit recovers.

The following diagram shows how this configuration works.



In the diagram, Router A is connected to Router B via a point-to-point link. This link, connected at port S21, can support any WAN protocol that the router supports. Router B has a demand circuit configured at S23. It also has the backup circuit parameter set to the circuit number of the point-to-point link S21. If the point-to-point link fails, Router B activates the demand circuit.

Making the Configuration Work by Configuring an Unused Port

Typically dial backup service provides backup for a failed primary connection. In this case, you cannot use dial backup service because the circuit will not stay active once the point-to-point connection recovers. Instead, you configure another port on the same router as the point-to-point circuit for dial backup service. You make this port an unused primary interface set for slave mode, so it does not initiate calls.

The backup does not activate until the remote router makes a demand connection. When a call comes in to this disabled port, the backup circuit comes up on the backup interface.

You configure this unused port on the same subnet as the demand circuit of the remote router. The demand circuit then connects to the router independent of the initial point-to-point circuit.

In the diagram, Router A's disabled port is S22. Port S22 has address 2.1.1.1, which is the same subnet as the demand interface on Router B. For Router A, you configure S22 as the disabled primary circuit and S23 as its backup circuit. Also, Router A's is set to slave mode, so it waits for the incoming call from Router B.

When the point-to-point circuit fails at S21, Router B establishes a demand circuit to Router A. Router A receives the call and brings up the backup circuit on S23.

Once the demand connection is established, it remains active until you manually terminate the connection using the Technician Interface command **force takedown**. Even when the point-to-point circuit recovers, if its routing protocol rule precedence is lower than the demand circuit's precedence, data continues to flow over the demand connection until you terminate it. By manually terminating the connection, you control when the router returns to the point-to-point circuit for transmission.

To configure this application, do the following:

1. **Using Site Manager, create a point-to-point circuit on one router.**
2. **Using Site Manager, configure dial backup service for one router, for example, a central site router, then disable the primary interface.**
3. **Using Site Manager, create a demand pool and circuit on a remote router.**

   This demand circuit will act as the backup circuit. Do not configure a backup circuit from Site Manager.
4. **Using the Technician Interface, set the wfSwserv0ptsBackupCct attribute of the router with the demand circuit configured to the point-to-point circuit number (for example, S21 in the diagram).**
5. **Set the Rule Precedence parameter of each circuit's routing protocol to designate which circuit the router will consider preferable.**

Supported Flash Memory Cards

Table 1 lists the 2-MB, 4-MB, and 8-MB Personal Computer Memory Card International Association (PCMCIA) standard Flash memory cards that are qualified for use in Bay Networks routers.

Table 1. Approved Flash Memory Cards

Size	Vendor	Part Number
2 MB	AMD	AMC002AFLKA
	Amp	1-797078-3
	Fujitsu	MB98A811220
	Intel	1MC002FLKA
	Maxell	EF21B(AA) WEL.M-20
	Mitsubishi	MF82ML-G1FAT01
	Panasonic	BN-02MHFR
	Texas Instruments	CMS68F2MB-250
4 MB	AMD	AMC004CFLKA-150
	Centennial	FL04M-20-1119
	Centennial	FL04M-20-11138
	IBM	IBM1700400D1DA-25
	Intel	IMC004FLSAQ1381
8 MB	AMD	AMC008CFLKA
	Centennial	FLO8M-25-11119-01
	Intel	IMC008FLSP/Q1422
16MB	Centennial	FL16M-20-1119-03
	Epson	HWB161BNX2

Standards Supported

Table 2 lists the Request for Comments (RFCs) and other standards documents with which Version 11.0 is compliant. Version 11.0 may support additional standards that are not listed in this table.

Table 2. Standards Supported by Version 11.0

Standard	Description
ANSI X3t9.5	Fiber Distributed Data Interface (FDDI)
IEEE 802.1	Logical Link Control (LLC)
IEEE 802.3	Carrier Sense Multiple Access with Collision Detection (CSMA/CD)
IEEE 802.5	Token Ring Access Method and Physical Layer Specifications
IEEE 802.10	Bridge with Spanning Tree
ITU Q.921	ISDN Layer 2 Specification
ITU Q.921	ISDN Layer 3 Specification
ITU X.25	Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuits
RFC 768	User Datagram Protocol (UDP)
RFC 791	Internet Protocol (IP)
RFC 792	Internet Control Message Protocol (ICMP)
RFC 793	Transmission Control Protocol (TCP)
RFC 813	Window and Acknowledgment Strategy in TCP
RFC 826	Ethernet Address Resolution Protocol
RFC 827	Exterior Gateway Protocol (EGP)
RFC 854	Telnet Protocol Specification
RFC 855	Telnet Option Specification
RFC 856	Telnet Binary Transmission

(continued)

Table 2. Standards Supported by Version 11.0 *(continued)*

Standard	Description
RFC 857	Telnet Echo Option
RFC 858	Telnet Suppress Go Ahead Option
RFC 859	Telnet Status Option
RFC 860	Telnet Timing Mark Option
RFC 861	Telnet Extended Options: List Option
RFC 863	Discard Protocol
RFC 877	Transmission of IP Datagrams over Public Data Networks
RFC 879	TCP Maximum Segment Size and Related Topics
RFC 888	"STUB" Exterior Gateway Protocol
RFC 894	Transmission of IP Datagrams over Ethernet Networks
RFC 896	Congestion Control in IP/TCP Internetworks
RFC 903	Reverse Address Resolution Protocol
RFC 904	Exterior Gateway Protocol Formal Specification
RFC 919	Broadcasting Internet Datagrams
RFC 922	Broadcasting Internet Datagrams in Subnets
RFC 925	Multi-LAN Address Resolution
RFC 950	Internet Standard Subnetting Procedure
RFC 951	Bootstrap Protocol
RFC 959	File Transfer Protocol
RFC 994	Protocol for Providing the Connectionless-mode Network Service
RFC 1009	Requirements for Internet Gateways
RFC 1027	Using ARP to Implement Transparent Subnet Gateways
RFC 1042	Transmission of IP over IEEE/802 Networks
RFC 1058	Routing Information Protocol

(continued)

Table 2. Standards Supported by Version 11.0 *(continued)*

Standard	Description
RFC 1075	Distance Vector Multicast Routing Protocol (DVMRP)
RFC 1076	Redefinition of Managed Objects for IEEE 802.3 Repeater Devices (AN Hubs only)
RFC 1079	Telnet Terminal Speed Option
RFC 1084	BOOTP Vendor Information Extensions
RFC 1091	Telnet Terminal-Type Option
RFC 1108	Security Options for the Internet Protocol
RFC 1112	Host Extensions for IP Multicasting Appendix I. Internet Group Management Protocol
RFC 1116	Telnet Line-mode Option
RFC 1139	Echo Function for ISO 8473
RFC 1155	Structure and Identification of Management Information for TCP/IP-based Internets
RFC 1157	Simple Network Management Protocol (SNMP)
RFC 1163	BGP-2 obsoleted by RFC 1267
RFC 1164	Application of BGP in the Internet
RFC 1166	Internet Numbers
RFC 1188	Proposed Standard for the Transmission of IP over FDDI
RFC 1191	Path MTU Discovery
RFC 1209	Transmission of IP Datagrams over SMDS
RFC 1212	Concise MIB Definitions
RFC 1213	MIB for Network Management of TCP/IP-based Internets
RFC 1267	Border Gateway Protocol 3 (BGP-3)
RFC 1293	Inverse ARP for Frame Relay
RFC 1294	Obsoleted by RFC 1490
RFC 1304	Definition of Managed Objects for the SIP Interface Type

(continued)

Table 2. Standards Supported by Version 11.0 *(continued)*

Standard	Description
RFC 1305	Network Time Protocol
RFC 1315	Management Information Base for Frame Relay DTEs
RFC 1323	TCP Extensions for High Performance
RFC 1331	Obsoleted by RFC 1661
RFC 1332	PPP Internet Protocol Control Protocol (IPCP)
RFC 1333	PPP Link Quality Monitoring
RFC 1334	PPP Authentication Protocols
RFC 1340	Assigned Numbers (obsoleted by RFC 1700)
RFC 1350	The TFTP Protocol (Revision 2)
RFC 1356	Multiprotocol Interconnect on X.25 and ISDN in the Packet Mode
RFC 1376	PPP DECnet Phase IV Control Protocol (DNCP)
RFC 1378	PPP AppleTalk Control Protocol (ATCP)
RFC 1390	Transmission of IP and ARP over FDDI Networks
RFC 1377	OSI over PPP
RFC 1403	BGP OSPF Interaction
RFC 1434	Data Link Switching: Switch-to-Switch Protocol
RFC 1483	Multiprotocol Encapsulation over ATM AAL5
RFC 1490	Multiprotocol Interconnect over Frame Relay
RFC 1552	The PPP Internetwork Packet Exchange Control Protocol (IPXCP)
RFC 1577	Classical IP and ARP over ATM
RFC 1583	OSPF Version 2
RFC 1634	Novell IPX over Various WAN Media (IPXWAN)
RFC 1638	PPP Bridging Control Protocol (BCP)
RFC 1654	Border Gateway Protocol 4 (BGP-4)

(continued)

Table 2. Standards Supported by Version 11.0 *(continued)*

Standard	Description
RFC 1661	Point-to-Point Protocol (PPP)
RFC 1662	PPP in HDLC-like Framing
RFC 1717	PPP Multilink Protocol (MP), obsoleted by RFC 1990
RFC 1755	Signaling Support for IP over ATM
RFC 1757	Remote Network Monitoring Management Information Base (RMON) (for AN Hubs equipped with Data Collection Module only)
RFC 1762	PPP Banyan VINES Control Protocol (BVCP)
RFC 1763	PPP DECnet Phase IV Control Protocol (DNCP)
RFC 1764	PPP XNS IDP Control Protocol (XNSCP)
RFC 1795	Data Link Switching: Switch-to-Switch Protocol, Version 1
RFC 1819	Internet Stream Protocol, Version 2
RFC 1989	PPP Link Quality Monitoring, obsoletes RFC 1333
RFC 1990	PPP Multilink Protocol (MP), obsoletes RFC 1717
VINES 4.11	The Bay Networks router software works with the Banyan VINES 4.11 standard. Bay Networks Router Software Version 8.10 and later also support VINES 5.50 sequenced routing.

Version 11.0 also now supports ATM UNI 3.1 signaling (as well as UNI 3.0). Version 3.1 and 3.0 are not compatible with each other.

Supported AFN, BayStack AN/ANH, and ASN Models, and Link Modules

For information on the hardware models, link modules, and net modules that Router Software Version 11.0 supports, refer to the Compatibility Matrix on the Customer Support home page on the World Wide Web (http://support.baynetworks.com). Select Online Library > General/Misc > Compatibility Matrix V*x.x* - Router.